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# OUR SOIL

**Its Wastage — Its Preservation**

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UNITED STATES DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE - REGION SEVEN

## Introduction

**ACCELERATED EROSION** has seriously depleted the soil resources of Nebraska, Kansas, and Oklahoma in the comparatively short time that this area has been farmed. During recent years it has become quite evident to farsighted farmers and landowners of this area that in order to insure a permanent, sound agriculture there must be a change from the exploitative farming methods adapted to pioneer conditions to a more conservative system of farming that properly takes into account the conservation of the soil.

This publication attempts to set forth in a brief way some of the causes and effects of man-induced erosion in the eastern parts of Nebraska and Kansas and all of Oklahoma excepting the extreme northwestern part. It also depicts some of the conservation farming methods that are being recommended by the Soil Conservation Service on its demonstration projects in this area. (See map on back cover.) The erosion-control practices herein discussed have met with the approval of thousands of farmers on the demonstration projects of the Soil Conservation Service. Hundreds of thousands of acres in this general area, however, are being farmed in an exploitative way; until sound methods of erosion control are adopted on this land its future will be in jeopardy.

Issued 1936; revised 1938



## Pioneer Farming

**WHEN** the first pioneers settled the prairies and plains of Nebraska, Kansas, and Oklahoma, they found a country of lush grass, a home for game, a land of agricultural opportunity. A deep layer of rich topsoil, high in organic matter and available plant food, blanketed hills and valleys. It had lain there for centuries slowly accumulating under a protective cover of vegetation. Upward of 400 years of Nature's time had been devoted to building each inch of this productive topsoil.

The pioneer, of necessity, broke the native grass sod. He had use for the soil. Corn, cotton, and wheat had to be grown to feed and clothe the Nation's fast-growing population. Little thought was given to soil conservation. There was no apparent need for erosion control.

## Soil Waste

**ALL TOO OFTEN** the pioneer farmer planted the same soil-depleting, erosion-producing crops on the land year after year. He ran his rows parallel with fence lines, up and down the slopes. He burned crop residues and set fire to his pasture and meadowland. After all he was pioneering a new region, and in that task he responded humanly to governmental policies and bread-and-butter requirements.

Rains fell, winds blew, and the soil, no longer protected by Nature's cover of vegetation, began to move. Inch by inch the topsoil began to slip away. Seldom did the pioneer farmer realize the extent to which erosion was robbing him of his richest topsoil.

Sheet erosion has increased from year to year. As the organic matter of the soil has been depleted, run-off has become greater, erosion has accelerated, and drought conditions intensified. Infertile subsoil that for centuries had been covered by productive topsoil has come to light. Gradually but surely the farmer is beginning to realize that his soil is washing away.





## **Destructive Farming Practices**

**FURROWS** running down the slope cause destructive erosion. The burning of crop residues destroys protective cover, depletes the humus of the soil, and reduces its water-absorbing ability, thus leaving the land vulnerable to wind and water erosion.





## Decreased Crop Yields

**SHEET EROSION** and gulying, with the resulting decrease in the water-absorbing capacity of the soil, have been important factors in causing decreased crop yields in many sections. In turn, the reduced yields in these damaged areas have had an adverse effect on the farm income and the standard of living of the farm family.





## Riddled Fields

**GULLIES** were the inevitable result of wrong methods of farming. Water concentrated in furrows plowed up and down the slope and rushed off the fields heavily laden with soil. As the spongelike topsoil was removed by sheet erosion, gullies became larger and more numerous. Fields that once produced bountiful yields became so cut up by gullies that they were no longer suitable for tillage. Fields had to be abandoned.

Thousands of acres in Nebraska, Kansas, and Oklahoma, that produced high yields of corn, wheat, and cotton when the pioneer first settled the land have become useless for any immediate crop production. In their place are abandoned farms and severely eroded submarginal land—land no longer capable of supporting a farm family or capable of producing sufficient revenue to pay taxes for the support of community and State. These eroded acres that lie stretched across the horizon are silent reminders of the heavy penalty Nature imposes for land abuse.

## Floods and Dust Storms

**FIELDS** stripped of their topsoil and deeply cut by gullies are not the climax of wrong farming methods. Soil, unprotected by binding grass roots and sheltering trees, robbed of its organic material, and tilled in rows that run up and down the slopes, quickly loses its power to hold raindrops that fall. Floods and dust storms follow.

Sweeping winds and rushing water carry destruction to land that has not been abused. Millions of acres of rich bottom lands have been damaged by flood waters that washed out crops and laid down a layer of unproductive subsoil material coming from eroding hillsides. Other millions of acres have been damaged by wind erosion and marching sand dunes.

People far removed from the eroding land have been alarmed by the recurring dust storms and by the speed with which expensive reservoirs are being filled with silt.





## Marching Deserts

**DURING** drought periods of recent years destructive wind erosion has progressed at an alarming rate over unprotected lands in parts of Oklahoma, Kansas, and Nebraska.





## Topsoil and Homes

**SOIL CONSERVATION** is home conservation. Well-protected soil and well-kept farm buildings usually go hand in hand. In contrast, soil waste has helped wreck some of rural America's finest homes of a quarter of a century ago. However, the rewards of erosion control are not limited to future generations. The application of soil conservation practices over a long period should benefit the present generation through increased yields that help provide an opportunity for higher standards of living.



## Conservation Farming

**A SATISFACTORY PROGRAM** of erosion-control and moisture-conservation should consist of:

1. Crop rotations, where feasible, to conserve soil and fertility.
2. Contour farming on all cultivated fields except where extremely irregular topography makes contouring impractical.
3. Contour strip cropping on clean-cultivated land, or field stripping on land so irregular that contouring is impractical.
4. Terracing on cultivated lands of reasonable slope when proper water disposal is practical.
5. Maximum use of natural vegetation, cover crops, and woody plantings for the protection of erodible areas.
6. Protection of woodlands and grasslands against fire. (This also applies to the destructive burning of crop residues.)
7. Systematic pasture management, including controlled grazing, contour furrowing or ridging, weed control, and protection against fire.
8. Economical gully control by diversion of water, fencing, and various vegetative and mechanical measures.
9. Retirement from cultivation of areas that are subject to severe erosion and use of such areas for pasture, meadow, woodland, and wildlife.
10. Location and construction of farm ponds and reservoirs to impound surplus water from fields, pastures, and woodlands.

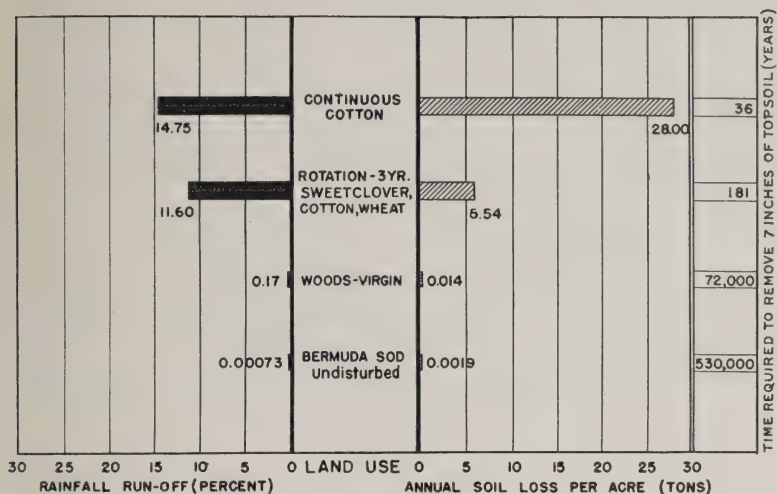
The coordinated use of these measures, each being applied to that portion of the land adapted to its use, should result in the maximum conservation of both soil and water, should improve the wildlife environment, and should be a helpful step toward flood control.



## **Crop Rotation and Cover Crops**

**GROWING LEGUMES** and other soil-building and erosion-resisting crops in rotation with soil-depleting crops is a fundamental step in the economical control of erosion and in maintaining the productivity of the soil in areas of sufficient rainfall. A well-planned rotation assists in providing a protective cover of vegetation for the soil during seasons of heavy rainfall.

Vegetative cover is one of the best preventives of erosion. Erosion-resistant cover crops grown in rotation with clean-tilled crops not only protect sloping hillsides from erosion, but may be important factors in weed and insect control. When plowed under as green manure they increase the organic content of the soil and supply more nitrogen for succeeding crops. They may serve as supplementary pasture crops or may produce profitable cash returns in many instances.



The effects of land use on run-off and soil loss on a 7.7-percent slope, Vernon fine sandy loam at Guthrie, Okla., are shown on the above chart. The figures represent an average for a 6-year period, 1930-35; average annual rainfall, 33.11 inches.

## TEMPORARY PASTURE AND LAND COVER





## Contour Farming

**CONTOUR FARMING** is conservation farming. Level rows, around the hill, act as miniature terraces to hold rain water where it falls and make it available for crop production, thus preventing rapid run-off that washes fertile topsoil away.

Contour farming may increase crop yields by conserving both soil and moisture. Tillage operations should be on the contour on any field that is sloping enough to permit run-off and erosion, except where extremely irregular slopes make contouring impossible.

Farming level rows conserves horse and tractor power as well as soil and water. Many farmers have found that it requires less tractor fuel and less horse power to pull farm implements in contour-tillage operations than is required where farming is done up and down the slope. Crops planted in level rows do not wash out so readily and seldom need to be replanted.

Many farmers in Nebraska, Kansas, and Oklahoma are relocating fences on the contour to eliminate point rows in their contour-tilled fields.

## Strip Cropping

**STRIP CROPPING** is a method of farming that consists of alternating contour strips of erosion-resistant crops with strips of clean-tilled crops. It is fast gaining in popularity with farmers in the humid sections of Oklahoma, Kansas, and Nebraska and is proving to be an efficient and economical erosion-control measure. Many farmers are using variable-width strips of erosion-resistant crops to eliminate point rows on contour-planted fields.

Contour strips of dense-growing legumes, small grains, and grasses check the speed of run-off water, filter out soil particles, and permit much of the moisture to be absorbed in the ground. Strip cropping may be used effectively in combination with a systematic crop rotation by planting to clean cultivated crops the strips that were sown to erosion-resistant crops the previous year.

Permanent strips of meadow or close-growing perennials have proved effective in controlling erosion on very steep slopes. Contour buffer strips of trees, grasses, and other perennials will retard downhill water flow, control erosion, and may form permanent field boundaries for contour tillage.



## Terracing

**TERRACING** has long been recognized as a basic step in erosion control. Properly constructed terraces convert running waters into slow-moving waters and materially reduce erosion even during seasons when the ground is bare.

Terraces serve as permanent guide lines for contour farming, they act as safety valves in times of torrential rains, and they check the growth of field gullies. Terraces are practical on most farm lands of medium slope but have their greatest value on fields where contour farming and strip cropping alone are unable to control erosion. Terraces require proper maintenance and care and must be supported by contour tillage, strip cropping, and other sound practices if they are to control erosion effectively.

Construction of terraces need not be an expensive operation. Equipment available on most farms can be used and the work can be done during slack seasons.





## Terrace Outlets

**BEFORE** terraces can function properly, provisions must be made for handling the water that collects above them. When a field is terraced, the water is concentrated in channels during heavy rains. This water must be released some place. Usually the most satisfactory terraces are those for which water-disposal systems are completed before the first furrow is plowed in building the terrace ridge. Various types of terrace outlets may be used to control the concentrated water.

A well-sodded pasture or meadow is a very desirable place to empty the water collected in terrace channels. Meadow strips or a well-grassed draw can be used. A properly constructed grassed waterway at the field boundary is also suitable for the disposal of run-off from terraces. In some cases it may be necessary to protect terrace-outlet systems by the use of masonry or concrete structures. Regardless of the type of outlet system used, it should always be planned, and constructed, if possible, before the terraces are built.

## Pasture Management

**OVERGRAZED PASTURES** may suffer serious erosion. Burning and overgrazing destroy the vegetative cover, resulting in greater run-off that is too often followed by serious sheet erosion and gulying. Millions of acres of pasture land in Nebraska, Kansas, and Oklahoma have been seriously damaged by improper management.

A good grass cover will check run-off and prevent erosion on pasture lands. There is little movement of water, even after a heavy rain, when the land is protected by a dense vegetative cover. Controlled grazing, rotation grazing, protection from fire, weed, and grasshopper control on pasture lands will pay dividends in increased grass yields. The use of temporary pastures to supplement permanent pastures will help prevent overgrazing of native pastures.

Contour furrows and ridges check run-off, reduce erosion, and keep rain water on the land for grass production. Properly constructed furrows or ridges have been known to hold practically all run-off from a 2-inch rain and have often caused a substantial increase in the growth of grass.





## Gully Control

**MAN-MADE GULLIES** do not get smaller. They continue to grow as long as water is discharged into them. Vegetation is Nature's method and usually the most economical way of checking gully growth. A diversion ditch will direct water from the gully head and fencing will protect the gully from grazing and trampling by livestock. These practices will give Nature a chance to heal the gullied area with vegetation.

Trees, shrubs, and grass are often planted on gullied areas to assist natural vegetation in checking erosion. Where it is necessary for gullies to carry quantities of water, their growth may be stopped by inexpensive check dams built of brush, wire, loose rock, or other materials available on the farm. Structures of this type not only stop the growth of the gully, but catch and hold soil on which vegetation can grow. Temporary check dams will usually last for several years and give ample time to establish a protective growth of vegetation for permanent control of the gully.

## Retiring Land From Cultivation

**BADLY ERODED LAND** is usually more profitable in grass or trees than in cultivation. An eroding hillside that will not produce corn or cotton profitably may make a desirable farm wood lot or a good pasture if retired from cultivation before erosion has robbed it of all topsoil and fertility. Establishing a permanent cover of vegetation on highly erodible areas has been found profitable by many farmers and is an economical method of reducing soil losses.

Plowing contour ridges on land being taken out of cultivation and planting the ridges to grass, trees, or shrubs according to the adaptability of the soil and climate is a practice recommended by the Soil Conservation Service. Thousands of acres of farm land in Oklahoma, Kansas, and Nebraska have been successfully retired in this manner.

All retired land should be protected from fire and grazing, and even where it is not practical to plow contour ridges and make erosion control plantings, such protection will give natural vegetation an opportunity to heal the scars of erosion.





## Wildlife Conservation

**EROSION CONTROL** and wildlife conservation are closely related. Plant cover that protects the soil from erosion furnishes a habitat for wildlife. Vegetation that furnishes food and cover for farm game is vegetation that holds rain-drops where they fall and keeps them from rushing off the land as silt-laden flood makers. Many severely eroded areas may be more profitably utilized for wildlife production than for growing crops.

Trees and shrubs planted for gully control may provide cover for wildlife; a gully fenced to protect vegetation from livestock may become the home of a covey of quail; an eroding hillside retired to grass may soon be inhabited by pheasants; and the farm wood lot may become the permanent shelter for small game and fur animals. With a little planning, farm wildlife can be greatly benefited by erosion-control work at little or no additional expense.

## Farm Ponds

**THE CONSTRUCTION** of farm ponds, where practical, is recommended by the Soil Conservation Service to impound surplus run-off water. Torrential rains that cause farm ponds to overflow make it important that the site of the pond be one where an adequate spillway can be constructed. Other factors to be considered in the selection of a farm pond site are: (1) Adequate drainage area; (2) proper soil formation; (3) protection from livestock; (4) provision for watering livestock; and (5) adequate erosion control on the drainage area.

Too much emphasis cannot be placed upon the importance of erosion control on the drainage area of a farm pond. Where possible the area should include only pasture, meadow, or woodland. If it is necessary to include cultivated land in the drainage area of the pond, such land should be properly protected by good soil conservation practices. Where erosion is not controlled on the drainage area above, the pond will be filled with silt in a short time.



# **Region Seven of the Soil Conservation Service**



## **EROSION-CONTROL DEMONSTRATION AREAS**

Albion, Nebr.	Ottawa, Kans.	Muskogee, Okla.
Ralston, Nebr.	Ardmore, Okla.	Pryor, Okla.
Syracuse, Nebr.	Chickasha, Okla.	Seiling, Okla.
Iola, Kans.	Duncan, Okla.	Stigler, Okla.
Mankato, Kans.	Elk City, Okla.	Stillwater, Okla.

## **S. C. S.—C. C. C. CAMPS**

Nebraska has 11 camps; Kansas 11; and Oklahoma, 21; total, 43.

## **SOIL CONSERVATION EXPERIMENT STATIONS**

Hays, Kans.; Guthrie, Okla.

## **SOIL CONSERVATION NURSERIES**

Lincoln, Nebr.; Manhattan, Kans.; Stillwater, Okla.

Regional Headquarters, Salina, Kans.

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